

Application No.: 10/754,410

SPECIFICATION AMENDMENTS

Please amend paragraph [0076] as follows:

[0076] Figure 1A shows a schematic of a microelectronic junction in accordance with one embodiment of the present invention. Figure 1A shows a first conductive member 1 or substrate such as a carbon pyrolyzed photoresist film ("PPF"). To this first conductive member 1 is attached a single layer of a plurality of nitroazobenzene molecules (the "chemical monolayer"), covalently bonded to the carbon PPF. The chemical monolayer 2 is disposed between the first conductive member 1 and the second conductive member 3 (i.e. a liquid such as a mercury drop in a device shown in Figure 1A), with a layer thickness as small as about 1.5 nm. Covalent bonding between the PPF film and the carbon leads to strong, electronic coupling between the molecular monolayer and the carbon PPF. In a finished device, the second conductive member 3 may be any appropriate material, such as a conducting metallic (or carbon) film that may be deposited on top of the monolayer 2.

Please amend paragraph [0077] as follows:

[0077] Figures 1A and [[1A]]1B also show electrical leads 4 and 5, with Figure [[1A]]1B showing a mercury drop and optional temperature controller 6.

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Please amend paragraph [0097] as follows:

[0097] Figure 13 shows an example of a multi-layer electronic device in accordance with one embodiment of the present invention. Figure 13 shows first conductive component 35 comprising a first contact surface 36; a monolayer 37 of a first plurality of substantially parallel first molecular units having first and second ends, each of the parallel first molecular units of substantially the same length and attached through its first end to the first contact surface 36 through a conjugated bond; a second conductive component 38 having first and second sides 39 and 40, respectively. The first side 39 is in electrical contact with the second ends of the parallel first molecular units, and the second side 40 having a second contact surface; a monolayer 41 of a second plurality of substantially parallel second molecular units having first and second ends, each of the parallel second molecular units attached through their first end to the second contact surface of the second side 40 through a conjugated bond; and a third conductive component 42 having first and second sides 43 and 44, respectively. The first side 43 is in electrical contact with the second ends of the parallel second molecular units. Figure 13 also shows that the monolayers 37 and 41 may become part of respective electrical circuits 45 and 46. Alternatively, multiple monolayer constructions of the present invention may be linked in a series to achieve accordingly different results in an electronic junction (i.e., taking advantage of the additive effects of each of a series of similar or dissimilar chemical monolayers).

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Please amend paragraph [0098] as follows:

[0098] Figures 14 and 15 show graphs of the current/voltage characteristics taken from experiments conducted on a monolayer described in Figures 1A and [[1A]]1B. Figure 14 demonstrates an exponential dependence of current on applied voltage, which is observed at low applied voltage (below about 1 volt). Figure 15 shows an example of "breakdown", in which the current suddenly increases at sufficiently high voltage (~1.2 volts in this case).

Please amend paragraph [0099] as follows:

[0099] Figure 16 shows a graph of the current/voltage characteristics taken from experiments conducted on a monolayer described in Figures 1A and [[1A]]1B when breakdown is avoided. Figure 16 shows a bipolar current/voltage curve showing the decrease in apparent resistance at both positive and negative potentials. Figure 17 shows a graph of a current/time plot taken from experiments conducted on a monolayer described in Figures 1A and [[1A]]1B. Figure 17 demonstrates the long-term stability of a molecular junction during cycling between +1.5 and -1.5 volts. Only minor changes in current voltage behavior occurred over 100,000 cycles during 14 hours.

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Please amend paragraph [0100] as follows:

[0100] Figure 18 shows a graph of the current/voltage characteristics taken from experiments conducted on a monolayer described in Figures 1A and [1A]1B. Figure 19 shows a graph of the natural log of current vs. $V^{1/2}$ taken from experiments conducted on a monolayer described in Figures 1A and [1A]1B. Figure 18 is the basis of Figure 19, which is a plot of the natural logarithm of the current vs. the square root of the voltage. The linearity demonstrated in Figure 19 is a strong indication that Schottky emission is the dominant mechanism of electron transport through the monolayer film.